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XXIII. *Experiments on a Mineral Substance formerly supposed to be Zeolite; with some Remarks on two Species of Uran-glimmer. By the Rev. William Gregor. Communicated by Charles Hatchett, Esq. F. R. S.*

Read July 4, 1805.

THIS mineral is raised in a mine called Stenna Gwyn, in the parish of St. Stephen's, in Branwell, in the county of Cornwall; the principal production of which is the compound sulphuret of tin, copper, and iron.

*Description.*

Two species of this mineral are found, assuming a marked difference in external character.

The first and most common one consists of an assemblage of minute crystals, which are attached to quartz crystals, in tufts, which diverge from the point of adherence, as from a centre. These tufts vary, as to the number of crystals, of which they are composed, and are light and delicate in the forms which they assume, or they are grouped together according to a variety of degrees of proximity and compactness. Sometimes they fill the whole cavity of a stone, with little or no interruption; in other specimens they are seen partially spreading over the sides and pointed pyramids of quartz crystals.

In some cases these grouped tufts adhere very pertinaciously to the stone which bears them; in others, they are easily separable, in comparatively large pieces, from the quartz, he

impressed form of which the pieces thus separated, retain. The surface of these, which was in immediate contact with the quartz, exhibits the several minute crystals of which the mass consists, matted together in various directions.

These crystalline assemblages are, in general, white; a nearer inspection of the individual crystals proves that they are transparent. Sometimes they are stained of a yellowish hue by ochry water.

The size of these crystals varies considerably in different specimens. Sometimes they assume the appearance of a white powder raised up in small heaps, upon the surface of the stone, to which they adhere. In other specimens they resemble a tender down. And the larger sort varies, in relative size, in the proportion, perhaps, in which a human hair, horse-hair, and a hog's bristle, severally differ from each other in magnitude. They seldom exceed a quarter of an inch in length. The figure of these crystals is not easily ascertainable, on account of their minuteness. By the help of a very powerful microscope, they appear to consist of four-sided prisms; where these are broken off, the section exhibits a rhomboidal, approaching indeed to an elliptical figure, from the circumstance of the angles of the prism being worn away; but that the prism itself is rhomboidal, cannot be inferred from hence, unless we could be certified, that the section were at right angles with the axis of it.

Imbedded amongst these crystals two species of crystalline laminae are frequently discoverable: the one consisting of parallelopipedon plates with truncated angles, applied to each other, of a green colour of various tints, from the emerald to the apple-green: the other species, consisting of an assemblage

of square plates, which vary in thickness. The angles of the several square laminæ, which are applied to each other are not always coincident. They are of a bright wax yellow. The sides of the largest of these square laminæ is about a quarter of an inch. This last species is frequently found adhering to the sides of quartz crystals, in the cavities of granite.

The other species of this mineral consists of an assemblage of crystals closely compacted together in the form of mamillary protuberances, in general, of the size of small peas, intimately connected with each other. A stratum of these about  $\frac{1}{8}$  of an inch thick is spread upon a layer of quartz, in the cavities or fissures of a species of compact granite. The striæ of which these mamillæ consist diverge from a centre, like zeolite. Some of the individual striæ, in some cases, overtop their fellows, in these globular assemblages, and evidently assume, on their projecting points, a crystallized form.

A.

(1.) The detached crystals of the former species are easily reduced to powder, of a brilliant whiteness. At the temperature  $56^{\circ}$  of FAHRENHEIT, its specific gravity was found to be 2,22.

(2.) The hardness of the more compact species is sufficient to scratch calcareous spar. At the temperature  $55^{\circ}$ , its specific gravity was 2,253. It does not imbibe water.

(3.) Some of the crystals exposed, on charcoal, to the flame of the blowpipe suddenly and strongly driven upon them, decrepitate: if they are gradually exposed to the flame they grow opaque, and become more light and tender: but they show no signs of fusion under the strongest heat.

(4.) The phosphate of soda and ammonia takes up a piece

of this mineral without effervescence, but it swims about the fused globule, unaltered. Borax dissolves a fragment of a crystal, and the globule remains transparent.

(5.) Some of this mineral, reduced to a fine powder, was mixed with about half its weight of pounded quartz, and kneaded with water into a ball: but as soon as the mass became dry, all cohesion was destroyed, and it fell into powder.

(6.) Sulphuric acid, poured upon some of it, caused no effervescence, nor was there any perceptible vapour extricated.

(7.) Some of the pulverized crystals were put into a crucible of platina, and sulphuric acid was poured upon them. The crucible was covered with a piece of glass, and placed in warm sand. On examination of the crucible and its contents, after some time, it appeared that the greater part of the mineral had been dissolved, but the surface of the glass cover was not in the least affected.

(8.) Some of the crystals were introduced into a small glass retort, to which a receiver was adapted. The retort was exposed to the heat of a charcoal fire. A fluid distilled over into the receiver, which had a peculiar empyreumatic smell. It changed litmus-paper to a faint red. It produced no change in a solution of nitrate of silver; but it caused a white precipitate in a solution of nitrate of mercury. I attributed these phænomena, at the time, to a small bit of the feather with which I had swept the powder into the retort, and which, I thought, had fallen into it. A slight whitish crust was also produced in the neck of the retort, but the smallness of the quantity did not admit of examination.

(9.) Some of this mineral exposed to a red heat, for about ten minutes, lost in weight at the rate of  $25\frac{5}{6}$  per cent. Another

portion, exposed to a stronger heat for more than an hour, lost  $30\frac{3}{4}$  *per cent.* This operation was performed in a crucible of platina; the cover of which gave some indications as if a slight portion of the finer parts had been volatilized.

Some of the compact species, after exposure to a red heat for one hour, experienced a diminution in weight of 30 *per cent.*

(10.) The sulphuric, muriatic and nitric acids, aided by a long digesting heat, effect nearly a complete solution of this substance. The quantity of the undissolved residuum is diminished in proportion to the purity of the mineral employed.

(11.) The nitrate of silver, as well as the muriate of barytes, produce no change in the solution of this substance in nitric acid.

(12.) The solutions of this substance in muriatic and nitric acids, cannot be brought to crystallize.

## B.

(1.) I selected some of the crystals of this substance, as free as it was possible from extraneous matter. 50 grains grossly pounded were exposed, in a platina crucible, to a red heat for one hour. They weighed, *whilst still warm*,  $35\frac{7}{8}$  grains, which is a loss of  $28\frac{1}{4}$  *per cent.* 25 grains of the same parcel, from which I had taken the former, exposed to a heat of longer continuance and greater intensity, were diminished in weight, at the rate of  $30\frac{3}{4}$  *per cent.*

(2.) The powder still preserved its pure whiteness. It was transferred into a matrass, and nitric acid poured upon it, which soon began to act upon it. The matrass was placed, for many hours, in a digesting heat. A solution of the whole

of the substance, except a small portion, was effected. I added a few drops of muriatic acid, and continued the digestion.

(3.) The acid was now diluted with distilled water, and poured off from the residuum, which consisted partly of a fine spongy earth, and partly of fragments of quartz. It was caught on a filter and sufficientlyedulcorated. The last portion ofedulcorating water dropped through the filter of an opalish hue.

The residuum, dried and exposed to a red heat, for ten minutes, =  $\frac{3}{16}$  of a grain,  $\frac{1}{16}$  of which consisted of fragments of quartz,  $\frac{1}{32}$  was found to be silica, and  $\frac{3}{32}$  alumina.

### C.

(1.) The clear solution and theedulcorating water were poured into a large matrass and boiled, and whilst boiling, the contents were precipitated, in white flakes, by ammonia.

(2.) When the ammonia had ceased to produce any further precipitate, the clear fluid was decanted, and assayed with carbonate of ammonia. But its transparency was not in the least disturbed.

(3.) This clear fluid, together with theedulcorating water, with which the subsided precipitate had been washed, was gradually evaporated. When its volume was considerably diminished, a separation of a spongy earth took place, more copiously than I had reason to expect, and the quantity of it was still further increased by a few drops of ammonia. This earth, thus separated, was sufficientlyedulcorated, and added to the former precipitate.

(4.) The fluid was again evaporated, and at last transferred to a crucible of platina, and the salt reduced to a dry state: on

redissolving this salt in distilled water a minute portion of earthy matter was separated, which, after edulcoration, was added to the rest. The fluid from which it had been separated, and the edulcorating water, were again evaporated to dryness, and the ammoniacal salt expelled by heat, in a platina crucible.

(5.) After the crucible had been made red hot, it was examined. I discovered on the bottom of it, some traces of earthy matter, and some spots, which had a glassy appearance. Water boiled upon it, dissolved nothing; from which circumstance, the absence of both of the fixed alkaline salts may be inferred. Neither did nitric acid produce any alteration. A few drops of sulphuric acid effected a solution of the substance, which adhered to the bottom of the crucible. Ammonia precipitated from it a small quantity of earth, which was transferred to the rest, and the sulphate of ammonia and edulcorating water were again evaporated and expelled by heat. A few spots of the same glazing still appeared. I had observed the same phænomenon in a former experiment: but in that, as well as in the present instance, the substance was in too small a quantity to become the subject of experiment.

#### D.

(1.) Upon the precipitate (C 1), and the earths collected at different times, whilst they were in a moist state, I poured a solution of potash in alcohol mixed with distilled water; in a short time, the greater part of it was dissolved.

The clear solution was decanted, and the undissolved sediment was transferred to a bason of pure silver, and boiled with a solution of potash.

(2.) When the potash ceased to act upon it, it was diluted



with distilled water and decanted from a brown powder, which had subsided. This powderedulcorated, dried, and ignited weighed  $\frac{7}{16}$  of a grain;  $\frac{1}{4}$  of a grain was alumina,  $\frac{3}{32}$  silica, and  $\frac{3}{32}$  oxide of iron.

## E.

(1.) The solution effected by potash was decomposed and redissolved by muriatic acid, and the contents of the solution were precipitated by ammonia. The subsided precipitate wasedulcorated.

(2.) The fluid and theedulcorating water were evaporated to dryness, and redissolved in distilled water. Here again, to my surprise, a separation took place of a white earth, more abundant than is usual in cases where ammonia is employed as a precipitant.

(3.) This earth and the precipitate wereedulcorated with distilled water, until it ceased to affect a solution of nitrate of mercury. Collected, dried, and ignited, for one hour it weighed *whilst still warm*  $32 \frac{1}{16}$ .

## F.

(1.) This earth was placed in a crucible of platina, and repeatedly moistened with sulphuric acid, which was abstracted from it in the sand bath; distilled water effected the solution of the whole, except a white powder which weighed, after ignition,  $2 \frac{7}{32}$  grains. It was proved to be silica.

(2.) This solution was now mixed with some acetat of potash and gradually evaporated; large and regular crystals of alum were from time to time formed. A small portion of silica which weighed after ignition  $\frac{1}{32}$  of grain was deposited;

some sulphat of lime also made its appearance, which washed with diluted alcohol and dried in a low heat  $= \frac{7}{16}$  of a grain.

(3.) A portion of the fluid remained which neither the addition of potash nor the lapse of many weeks could induce to crystallize. Suspecting that it might contain glucine, I precipitated the contents by carbonat of ammonia, added to excess, and shook the mixture repeatedly and strongly. The precipitated earth was collected and the fluid boiled, but it was found to contain nothing but a minute portion of alumina.

(4.) The edulcorated earth was redissolved in sulphuric acid, except  $\frac{5}{8}$  of a grain of ignited silica.

The solution was mixed with a little potash, and gradually evaporated. Sulphat of lime was separated at several times and after long intervals, which sufficiently washed and dried in a low heat  $= \frac{2}{32}$ . Some silica also separated, but too minute in quantity to be ascertained by weight. The remaining fluid at length crystallized into regularly formed alum.

(5.) The whole, therefore, of the  $32 \frac{1}{16}$  (E. 3.) consisted of alumina except  $2 \frac{7}{8}$  of silica, and the lime contained in  $\frac{23}{32}$  of sulphat of lime, which may be estimated about  $\frac{3}{16}$  of a grain; the alumina, therefore,  $= 29$ ; the alumina in B. and D.  $= \frac{1}{32}$ ; the silica in B, D, and F,  $= 3 \frac{1}{16}$ ; the oxide of iron (D.)  $= \frac{3}{32}$ , and lime F,  $\frac{3}{16}$ ; the volatile parts of this substance  $= 15 \frac{3}{8}$  in the 50 grains employed.

The sum total of these is	-	-	-	-	-	$47 \frac{1}{16}$
Loss	-	-	-	-	-	$2 \frac{5}{16}$
						<hr/>
						50

I have subjected these crystals, as well as the harder species of this mineral, to analysis by means of direct solution in

sulphuric acid, and have found in each case the same fixed ingredients, viz. alumina, a small portion of silica, and a very minute quantity of lime. Both these latter ingredients are, I think, essential to the composition of this fossil, as I have always discovered them in the purest specimens. In this mode of analysis I experienced the same difficulty and tediousness of delay in bringing the last portions of the solution to crystallize into alum. This anomalous circumstance I have reason to attribute to a particular combination, which takes place between the sulphat of alumina and lime, silica, and potash. In my examination of the compact species there was no appearance of the sulphat of lime until the last; and in every experiment, previously to the fresh appearance of crystals of alum, that had been long delayed, silica and sulphat of lime were deposited.

I forbear entering into any further details concerning my former experiments on this curious fossil, as I have reason to think that it will still require a more particular and minute examination, on account of another ingredient which eluded my notice, and which may possibly impart to it its peculiar character. The scarcity of it has been hitherto a great bar to my experiments; I shall record, however, a few facts which I have lately observed, in the hope that at a future time I may be able to resume my examination of it.

I was induced to pay more attention to the volatile ingredients of this substance.\* With this view, I introduced some of the crystals into a small retort, adapted a receiver unto it,

\* Mr. HUMPHRY DAVY, whose well known skill and sagacity have probably rendered the researches of another person superfluous, had, I found, been engaged in the analysis of a mineral which is thought to be identical with the subject of these observations. He informed me that he had observed a peculiar smell, and acid properties in the water distilled from the substance which he examined.

and exposed the retort to a charcoal fire. The neck of the retort was soon covered with moisture, which passed into the receiver ; and I observed a white crust gradually forming in the arch and neck of the retort.

On examination of the fluid in the receiver, it was found to have the same empyreumatic smell that I had observed before. It resembles very much the smell which that fluid is found to have which is distilled from the white crust that surrounds flint as a nucleus.

It changed litmus paper to a faint reddish hue. It produced no change on a solution of nitrat of silver, and scarcely a perceptible one, on that of nitrat of mercury.

The crust formed in the neck of the retort consisted of thin scales, which after the vessel had been dried, were disposed to separate from the glass in some places, but in others they firmly adhered unto it. They were opaque, like white enamel, and reflected the colours of the rainbow. A portion of this substance exposed to the flame of the blow-pipe upon charcoal turned at first black, and then melted into a globule, that exhibited somewhat of a metallic splendor which soon grew dull. This substance is soluble in water ; on evaporation of it, it assumes, at the edges of the fluid, a saline appearance, which, as the moisture evaporates, becomes earthy, opaque, and white. Some of the solution changed litmus paper to a faint red. Lime and strontian waters produce in it white clouds, which a drop of nitric acid removes. Murriats of lime and barytes produce no change in it. Nitrat and acetat of barytes disturb its transparency, the effect produced by the latter is more evident. Nitrat of silver produces no effect, but nitrats of mercury and lead cause copious precipitates, which

are white, and soluble in nitric acid. Phosphat of ammonia and soda produced a white precipitate. Oxalat, tartrite, and prussiat of potash did not affect it, nor did sulphat of soda. Ammonia was dropped into it, but the fluid preserved its transparency. But carbonat of ammonia instantly caused a white precipitate, which was not redissolved by an excess of the precipitant; upon some of this subsided precipitate a concentrated solution of potash was poured and shaken with it, but it was not sensibly diminished. But if after edulcoration it be dissolved in nitric acid, and potash be added, no precipitate is produced.

Carbonat of potash causes a white precipitate when dropped into the aqueous solution of the scaly sublimate.

The supernatant fluid was poured off and gradually evaporated, but it became repeatedly turbid, nor could I by means either of the filter or alcohol prevent a recurrence of the same effect. Nearly the same result takes place when carbonat of ammonia is used as the precipitant.

Some of the white scales were moistened with sulphuric acid. No vapour arose.

Some of the precipitate obtained by means of carbonat of potash from the watery solution of this substance, was, after sufficient edulcoration, dissolved in sulphuric acid; the solution, on due evaporation, produced permanent crystals, some of which resembled alum, but others seemed to differ from it in external character. Ammonia decomposed the solution of them in water, and a few drops of liquid potash dissolved the precipitated earth. The quantity was too small for further experiment.

If distilled water be poured into the retort and boiled in it, so

as to dissolve what adheres to the neck and cavity of it, a further solution is effected, but differing in some measure from the solution of the sublimate collected from the neck of the vessel. This latter solution is found to contain lead. If nitric or muriatic acid be poured into the retort, so as to dissolve what *still* remains adhering to it, the presence of lead becomes more evident. Whence does this metal arise? I have reason to believe that it arises from the glass retort, which is corroded by the acid of the fossil extricated by heat. But what acid is it? It does not seem to be either the phosphoric or fluoric acids, the latter of which became the first object of my suspicion.

The opinion which Mr. DAVY suggested to me seems more probable, that it is of vegetable origin. Oxalic acid, on the authority of BERGMAN, may be volatilized; yet some of its properties are very extraordinary and do not accord with this idea.

I decomposed the watery solution of the scales by nitrat of lead, and after a sufficient edulcoration of the subsided precipitate, I dropped upon it some sulphuric acid. No fumes were perceptible. The sulphat of lead was separated by the filter, and the clear fluid, which passed through it, was gradually evaporated; small crystallizations were formed, the figure of which I could not ascertain; some of them were exposed to the flame of the blowpipe in a gold spoon; they did not burn to coal, nor give out any empyreumatic smell nor fuse, but they assumed an earthy appearance.\*

\* I subjected some of the Barnstaple mineral, with which Mr. RASHLEIGH kindly furnished me out of his cabinet, to experiment, with a view of ascertaining whether it would produce the same volatilized saline crust, as the Stenna Gwyn fossil, and I found that it did.

*Uran-glimmer.*

I shall add a few desultory remarks upon the yellow and green crystals, which frequently accompany this fossil.

I considered them to be the two species of *Uran-glimmer*, which had been examined by the celebrated KLAPROTH.

The yellow cubic crystals are light. Their specific gravity, taken at temperature 45° FAHRENHEIT, was 2,19.

Exposed to the flame of the blowpipe on charcoal, they decrepitate violently. A piece of this substance is taken up by phosphate of ammonia and soda, without effervescence, and communicates a light emerald-green colour to the fused globule.

By exposure to a red heat, this substance loses nearly a third part of its weight. It then becomes of a brassy colour.

It is soluble in the nitric and muriatic acids: but I could procure no crystallized salt from the solution of either of them.

By evaporation to dryness, and redissolving the mass, some silica is separated.

## A.

(1.) A certain quantity of the yellow crystals were dissolved in nitric acid. Muriatic and sulphuric acids successively dropped into the solution produced no sensible change. The contents of the solution were precipitated by ammonia, in white clots, mixed with some of a yellowish hue. Ammonia, added in excess, betrayed no sign of the presence of copper.

(2.) The ammonia, on evaporation, was found to have held a portion of the mineral in solution. A fresh portion of ammonia dissolved more, but in a less quantity, at each succeeding affusion of it.

(3.) The precipitate, which had resisted the ammonia, was boiled in a silver crucible, with a solution of potash in alcohol,

diluted with distilled water, and a considerable portion of the substance was dissolved by it: the potash and the ammonia had dissolved rather more than half of the fixed ingredients of it.

(4.) The edulcorated residuum, which was of a dirty yellow colour, was transferred to a crucible of platina, and moistened with sulphuric acid, which was abstracted from it, in the sand-bath. The brownish-gray mass was elixated with distilled water, which dissolved nearly the whole of it. The residuum consisted of a white heavy powder, which, tried in different ways, was found to be sulphate of lead.

(5.) The solution effected by sulphuric acid was greenish. On evaporation, a salt was produced, of uncommon brilliancy, resembling scales of mica, or silver leaf. These diminished in quantity at every fresh solution and evaporation, and at last they could not be reproduced; but a confused crystallized mass remained. How far the platina crucible may have contributed to this phenomenon I cannot ascertain.

(6.) The solution of the saline mass was precipitated by potash, of a dark brown colour. The potash held nothing in solution. I redissolved the precipitate in nitric acid, and precipitated the solution by ammonia, of a bright yellow colour, peculiar to the oxide of uranium, with which it agreed in other properties.

(7.) What was dissolved by ammonia (2.) amounted to nearly  $\frac{1}{6}$  part of the fixed ingredients. It was white, inclining to ash-colour. It tinged phosphate of soda and ammonia of a light green. It was soluble in sulphuric acid, except a few gelatinous flakes. The solution was greenish; gradually evaporated, it shot into a number of minute stellated crystallizations, which were circular, and consisted of rays diverging from a



centre. They were, in general, colourless : a few of them were tinged of a smoke-colour. They soon became deliquescent. Upon evaporation, the same crystallizations were produced. After a time, some detached, regular, and permanent crystals were formed, which were colourless. Their figure I could not accurately ascertain. They were exposed to a red heat in a platina crucible. No ammoniacal vapour was perceptible. The crystals melted into opaque globules : some of these were transferred to a small glass, and distilled water was poured upon them. No solution took place, apparently : on shaking the glass, the globules fell to pieces into gelatinous flakes, which were white. Some of the supernatant fluid was tried with muriate of barytes, which produced a cloud. But neither ammonia nor prussiate of potash caused any change in it. It is soluble also in nitric acid : the solution formed a confused crystallized mass, which soon became deliquescent. Zinc, immersed in it, caused the separation of white gelatinous flakes. Iron caused no change. Ammonia and potash threw down white precipitates, a portion of which were redissolved. The carbonates of soda, potash, and ammonia produced white precipitates. Prussiate of potash threw down the contents of the solution in distinct flakes, of the colour of mahogany ; and the solution of galls in alcohol caused a light yellow powder to subside. It is soluble also in muriatic acid ; the solution is a very dilute green. It requires an excess of acid to hold the substance in solution ; which, after a time, deposits crystalline grains of a yellowish colour, which require a large quantity of water to dissolve them.

Acetic acid does not dissolve this powder.

(8.) What was dissolved by potash (3.) was of an ISABELLA colour : it was tried with nitric, muriatic, and sulphuric acids,

neither of which could dissolve the whole of it. What resisted the two former acids was found to be silica. That which remained undissolved by the latter, was silica and sulphate of lead. Evaporation of the latter solution, betrayed also the presence of lime, in the state of sulphate. The nitric and muriatic solutions, on evaporation, deposited nitrate and muriate of lead; and sulphuric acid dropped into them produced a small quantity of sulphate of lime.

The nitrate and muriate of lead were decomposed by sulphuric acid, and the lead reduced on charcoal.

Ammonia precipitated what remained in these solutions, and redissolved a part of the precipitates, which agreed in properties with that substance before mentioned (2.); the remainder was of a brighter yellow. But I could not bring the solution of it in nitric acid to crystallize.

#### B.

(1.) Some of the yellow crystals, which had not the slightest appearance of being contaminated with extraneous matter, were dissolved in sulphuric acid. Silica was separated; and the presence of lime and lead proved by the appearance of their respective sulphates.

(2.) If sulphate of ammonia is dropped into a solution of this mineral in nitric or muriatic acids, no change takes place, *immediately*. But on evaporation, a yellowish crust is deposited, which is insoluble in water. A solution of carbonate of soda in water, boiled on it, becomes yellowish-brown, and the greater part of it is dissolved. The residuum, which is white, is reduced on charcoal to a globule of lead. What the carbonate of soda had dissolved was found to be oxide of uranium. Sulphuric acid *alone*, does not produce this deposited crust.

(3.) Some perfectly pure crystals were dissolved in muriatic acid. Some silica was separated. A few drops of sulphuric acid were dropped into the solution, which produced no immediate change: on evaporation a white powder separated, which consisted in part of sulphate of lime. The remainder, exposed to the flame of the blowpipe, was reduced to globules of lead.

The solution was decomposed by ammonia, which redissolved a part of the precipitate; and, after edulcoration, the precipitate was dissolved by nitric acid, and precipitated again by ammonia, which held a less quantity in solution. The edulcorated precipitate was now boiled with a solution of carbonate of soda, which dissolved a large portion of it. The solution was yellowish-brown, and contained oxide of uranium. What was undissolved by the carbonate of soda was dissolved in sulphuric acid, and seemed to be the same substance as that which the ammonia held in solution. A. (2.)

The scarcity of this beautiful mineral has precluded me from operating on such a sufficient quantity, as a regular and rigid analysis required.

The substance, which is held in solution by ammonia, has some peculiar properties that seem to distinguish it from uranium. And if this mineral be the Uran-glimmer, I have certainly detected the oxide of lead, lime, and silica in it, which have not hitherto been considered as ingredients of that fossil. The green crystals differ in no respect from the yellow, except in containing a little of the oxide of copper.

Creed,

June 14th, 1805.